

Will the “Oil and Gas Revolution” Pass China by?

by Jonathan Chanis

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The United States is undergoing a historic energy transformation. The heightened vulnerability that began in 1973 is giving way to a period of significantly less risk. The immediate cause of this transformation is improvement in petroleum and natural gas extraction methods, especially the use of hydraulic fracturing and horizontal drilling techniques. Given the technological basis of this change, many wonder if a US-style oil and gas revolution can be transferred, either purposefully or surreptitiously, to China. If this revolution were to reach China, both its energy insecurity and its global greenhouse gases emissions would be significantly reduced. However, even if China acquired the US technology, it is unlikely that this revolution can be replicated.

The proximate cause of the US energy revolution is technological, but the more important cause is better industry organization and a more agile and adaptable oil and gas business culture. Even in comparison to most other US industries, oil and gas companies and managers are different. Integral to this system and culture are a greater acceptance of uncertainty, a lower tolerance for hierarchical relationships, and a higher regard for the individual over the collective. All of this encourages greater risk taking. The US system also organizes its oil and gas industries through private corporations instead of state ownership. The negative impact of state ownership in areas such as labor and capital efficiency, operational innovation, and reserve growth is well recognized. These characteristics and the contrast with China are raised, not to trumpet US “superiority,” but simply to note that if China values efficient production of oil and gas, then a system more closely resembling that in the US would produce better results.

In examining the issues restraining a petroleum and natural gas revolution in China, one can divide them into physical issues and organizational/cultural issues. The physical issues include such things as geology, hydrology, and pipeline networks. For example, when considering *oil* production, it is clear that China does not have sufficient *petroleum* source rock to duplicate the US experience. As is clear from many sources including the Energy Information Agency (EIA) and BP, the oil just is not there.

However, when it comes to shale gas, the geology is much more favorable. While questions remain about the amount of hydrocarbon bearing material in China’s shale deposits, there certainly are enormous amount of this rock. The EIA, for

example, thinks China may even have 50 percent more *technically recoverable* shale gas resources than the US. As for water, as FAO and others make clear, China is substantially water constrained, but given slow, steady progress in minimizing water use in fracturing, this constraint becomes smaller (for both countries) every year. Regarding pipelines, according to the EIA the US has almost 8 times as many miles of natural gas transport capacity as China. To consume any newly produced bounty of natural gas, China would have to build out its pipeline network. This is expensive and time consuming.

On the whole, the physical limitations favor the US. But geology, hydrology, and pipeline networks are all physical problems that, to a large extent, can be overcome with known and developing physical solutions. China’s real problem concerns industry organization and business culture.

The most serious organizational issue is lack of private ownership of mineral rights. Private ownership makes it easier for land to be leased or sold for development; it promotes the transfer of assets to individuals and companies interested and able to produce the resource. It is not an accident that the US energy revolution is taking place primarily on privately owned land.

The dominance of the big three Chinese state owned oil and gas companies (CNPC, Sinopec, and CNOOC) is another major problem. One of the primary reasons the US natural gas industry is so successful is because it is composed of thousands of independent companies. These companies are innovative and they are able to deploy nimbly hundreds of rigs and other exploration and production assets.

The dominance of CNPC in the pipeline sector further constrains China’s gas development. The US pipeline system is built upon “common carriers” and “open access.” Any natural gas producer that meets minimum safety and commercial standards, and who can pay for space is given access to the network. This allows exploration and production companies to invest in projects with the knowledge that the state, or a competitor, cannot unfairly keep it off the pipeline network.

China also faces environmental challenges to fracturing, both from the vagaries of its own regulations and enforcement mechanisms, and from popular challenges to extractive operations. The US had decades to work out its regulations and the conflicts it creates. But even in the US, these regulations still are a major source of discord. However, the federal system makes solutions to these problems easier because local jurisdiction promotes regulations tailored to local preferences and limits the ability of central authorities to intervene. China’s national approach to regulation and enforcement most likely will retard development of its shale resources.

China, like many other countries, also needs natural gas royalties and taxes reform. Ironically, reform in this area might be easier since it does not necessarily threaten Communist Party or other vested interests' control over oil and gas assets. All oil-producing countries, whether they have market- or state-driven economies, have to grapple with this issue. The point is to make the fiscal regime stable, transparent and, nondiscriminatory – especially among *domestic* companies. While the record of most non-Anglo-Saxon countries in this regard has not been terribly good, perhaps China's leadership can get this right.

A final area where reform is necessary and where the Chinese leadership may make progress is natural gas pricing. Historically, Chinese natural gas prices were fixed below the cost of production and well below the LNG import price. This was done primarily to subsidize domestic manufacturers. However, over the last few years there has been experimentation with market pricing mechanisms and exchange trading. If the Chinese leadership wants to promote domestic shale gas production, they will need to continue this liberalization.

Chinese promotion of shale gas development is restrained primarily by the nature of their industrial organization and business culture, not by physical or technical problems. Essential reforms, such as mineral ownership privatization and breaking up the domestic oil and gas oligopoly, strike at the heart of Communist Party control and privilege. Other issues, such as natural gas price decontrol, and designing a proper tax and royalty regime, are difficult for any political system, even when it is committed to reform. And the environmental regulatory regime issue is particularly hazardous even under the best of circumstances. If China wishes to experience a US-style energy revolution – and not see the gap in energy security with the United States continue to widen – another more extensive round of market-oriented reforms needs to occur in its oil and gas industries.

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